

hailstorms in Connecticut and New Hampshire. At South Weathersfield, Conn., a severe hailstorm occurred about 3 p. m. Some damage by hail was reported at Littleton, N. H. A boy was killed by lightning near Gloversville, N. Y. A heavy thunder and rain storm occurred at Jupiter, Fla., in

the afternoon. During a thunderstorm in the evening at Little Rock, Ark., the wind reached a velocity of 54 miles per hour. A severe thunder, rain, and hail storm visited Concordia, Kans., in the morning. Thunderstorms were reported in Missouri and South Dakota.

## INLAND NAVIGATION.

## FLOODS.

The month opened with the Mississippi River above the danger-line from Helena, Ark., southward. At Vicksburg, Miss., the stage of water, 46.7 feet, was the highest noted for the month. At Nashville, Tenn., the Tennessee River rose rapidly and reached 19.4 feet on the gauge, a rise of 9.1 feet in 24 hours. At Cairo, Ill., the Ohio River was rising slowly and passed the danger-line by the morning of the 2d. The Ohio River continued to rise at Cairo until the 6th, when a stage of 43.3 feet, 3.3 feet above the danger-line was reached. The Mississippi River passed the danger-line at Memphis, Tenn., on the 7th, and the maximum stage of the month at that point, 33.5 feet, was noted from the 11th to the 14th. On the 13th a small break occurred in the Magnolia Mound levee near Baton Rouge, La.; the break was closed by the night of the 13th. On the 16th a crevasse was reported near Napoleonville, Assumption Parish, La. The evening of the 18th a break occurred in the levee on the Reserve plantation at Saint Peters, La. The night of the 18th a break occurred in the levee at Convent, La. By the 22d the Reserve crevasse had been closed. The evening of the 23d a serious crevasse occurred in front of the Rescue plantation on the left bank of the river about one mile above Ascension Parish. The Rescue crevasse increased in width during the 24th and 25th, and caused a gradual fall in the river below that point. At New Orleans, La., the water, which reached a stage of 17.9 feet the evening of the 23d and continued nearly stationary until noon of the 24th, fell one foot by the close of the month.

## STAGE OF WATER IN RIVERS.

The following table shows the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence; and the monthly ranges:

Heights of rivers above low-water mark, June, 1893.

| Stations.                 | Danger-point on gauge. | Highest water. |         | Lowest water. |        | Monthly range. |
|---------------------------|------------------------|----------------|---------|---------------|--------|----------------|
|                           |                        | Height.        | Date.   | Height.       | Date.  |                |
| <i>Red River.</i>         | <i>Feet.</i>           | <i>Feet.</i>   |         | <i>Feet.</i>  |        | <i>Feet.</i>   |
| Shreveport, La. ....      | 29.2                   | 21.8           | 16-17   | 14.8          | 30     | 7.0            |
| <i>Arkansas River.</i>    |                        |                |         |               |        |                |
| Fort Smith, Ark. ....     | 22.0                   | 16.8           | 2       | 4.0           | 27     | 12.8           |
| Little Rock, Ark. ....    | 23.0                   | 21.5           | 3       | 7.3           | 30     | 14.2           |
| <i>Missouri River.</i>    |                        |                |         |               |        |                |
| Fort Buford, N. Dak. .... | 25.0                   | 16.3           | 17      | 10.8          | 1-3    | 5.5            |
| Bismarck, N. Dak. ....    | 75.0                   | 11.6           | 18      | 5.5           | 4.5    | 6.1            |
| Pierre, S. Dak. ....      | 13.0                   | 7.8            | 21, 26  | 0.4           | 12, 13 | 7.4            |
| Sioux City, Iowa. ....    | 18.7                   | 14.1           | 22      | 9.7           | 12, 13 | 4.4            |
| Omaha, Nebr. ....         | 18.0                   | 12.9           | 23, 24  | 8.9           | 14, 15 | 4.0            |
| Kansas City, Mo. ....     | 21.0                   | 17.2           | 26      | 12.2          | 19     | 5.0            |
| <i>Mississippi River.</i> |                        |                |         |               |        |                |
| Saint Paul, Minn. ....    | 14.0                   | 9.5            | 1       | 4.4           | 30     | 5.1            |
| La Crosse, Wis. ....      | 10.0                   | 10.0           | 1, 2    | 4.6           | 30     | 5.4            |
| Dubuque, Iowa. ....       | 16.0                   | 12.9           | 2, 4, 5 | 6.0           | 30     | 8.9            |
| Davenport, Iowa. ....     | 15.0                   | 10.4           | 1       | 4.4           | 30     | 6.0            |
| Keokuk, Iowa. ....        | 14.0                   | 12.2           | 1       | 5.5           | 30     | 6.7            |
| Hannibal, Mo. ....        | 17.0                   | 14.0           | 1       | 7.0           | 30     | 7.0            |
| Saint Louis, Mo. ....     | 30.0                   | 26.0           | 4       | 17.6          | 23     | 10.4           |
| Cairo, Ill. ....          | 40.0                   | 43.3           | 6       | 21.0          | 26     | 22.3           |
| Memphis, Tenn. ....       | 33.0                   | 33.5           | 11-14   | 16.5          | 29     | 17.0           |
| Vicksburg, Miss. ....     | 41.0                   | 40.7           | 1       | 42.3          | 30     | 4.4            |
| New Orleans, La. ....     | 13.0                   | 17.9           | 24      | 16.0          | 4      | 1.9            |
| <i>Ohio River.</i>        |                        |                |         |               |        |                |
| Parkersburg, W. Va. ....  | 38.0                   | 9.5            | 7       | 4.6           | 18     | 4.9            |
| Cincinnati, Ohio. ....    | 45.0                   | 21.0           | 5       | 10.2          | 19     | 10.8           |
| Louisville, Ky. ....      | 24.0                   | 10.0           | 7       | 5.4           | 20     | 4.6            |
| <i>Cumberland River.</i>  |                        |                |         |               |        |                |
| Nashville, Tenn. ....     | 40.0                   | 32.0           | 2       | 3.8           | 30     | 28.2           |
| <i>Tennessee River.</i>   |                        |                |         |               |        |                |
| Chattanooga, Tenn. ....   | 33.0                   | 20.7           | 8       | 4.1           | 30     | 16.6           |
| Knoxville, Tenn. ....     | 29.0                   |                |         |               |        |                |
| <i>Monongahela River.</i> |                        |                |         |               |        |                |
| Pittsburg, Pa. ....       | 22.0                   | 7.1            | 30      | 2.2           | 13     | 4.9            |
| <i>Savannah River.</i>    |                        |                |         |               |        |                |
| Augusta, Ga. ....         | 32.6                   | 13.5           | 8       | 6.5           | 30     | 7.0            |
| <i>Willamette River.</i>  |                        |                |         |               |        |                |
| Portland, Oregon. ....    | 15.0                   | 22.0           | 15      | 18.0          | 29, 30 | 4.0            |
| <i>Susquehanna River.</i> |                        |                |         |               |        |                |
| Harrisburg, Pa. ....      | 17.0                   | 3.7            | 1, 2    | 1.6           | 22, 23 | 2.1            |
| <i>Alabama River.</i>     |                        |                |         |               |        |                |
| Montgomery, Ala. ....     | 48.0                   | 21.3           | 8       | 4.2           | 26     | 17.1           |
| <i>Jones River.</i>       |                        |                |         |               |        |                |
| Lynchburg, Va. ....       | 18.0                   | 5.5            | 3, 4    | 0.7           | 30     | 4.8            |
| <i>Sacramento River.</i>  |                        |                |         |               |        |                |
| Red Bluff, Cal. ....      | 22.0                   | 4.9            | 1       | 2.3           | 30     | 2.6            |
| <i>Des Moines River.</i>  |                        |                |         |               |        |                |
| Des Moines, Iowa. ....    | 19.0                   | 6.7            | 12      | 4.0           | 30     | 2.7            |

\* For 29 days.

## ATMOSPHERIC ELECTRICITY.

## THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky Mountains they were reported in the greatest number of states, 33, on the 3d and 21st; in 32 on the 4th; in 31 on the 30th; in 20 to 30 on the 1st, 2d, 5th, 6th, 10th to 17th; 19th, 20th, 22d, and 25th to 29th; and in 10 to 19 on the 7th, 8th, 9th, 18th, 23d, and 24th.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 29, in Florida; on 20 to 28 in Colorado, Georgia, Illinois, Iowa, Kansas, Louisiana, Michigan, Missouri, New York, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Virginia, and West Virginia; and on 10 to 19 in Alabama, Arkansas, Connecticut, Indiana, Kentucky, Maryland,

Massachusetts, Minnesota, Mississippi, Nebraska, New Hampshire, Vermont, and Wisconsin. The only states in which thunderstorms were reported on less than 10 dates were New Jersey on 8 dates, the District of Columbia and Montana on 7, Oklahoma on 6, Rhode Island on 4, and Delaware on 3.

West of the Rocky Mountains thunderstorms were reported in Arizona on the 7th, 8th, 9th, 18th, 24th, 25th, 26th, and 30th; in California on the 21st; in Idaho on the 22d and 27th; in Nevada on the 12th and 13th; in New Mexico on the 7th, 12th, 17th, 18th, and 25th; in Oregon on the 6th, 11th, 21st, 22d, 24th, and 27th; in Utah on the 13th, 25th, and 26th; in Washington on the 3d, 5th, 6th, 10th, 18th, and 24th; and in Wyoming on the 4th, 5th, 14th, and 26th to 29th. There were no states or territories in which thunderstorms were not reported.

## AURORAS.

Auroras were reported as follows: 2d, Glenwood, Nebr.

3d, Worcester, Mass.; Valley Junction, Wis. 4th, Addison, N. Y. 5th, Collegeville, Minn.; Hartlandt, Vt. 7th, Winthrop, Mass.; Saint Olaf, Minn.; Berlin Mills, N. H.; Trenton, N. J.; Big Prairie and Dupont, Ohio; Chelsea, Vt.; Raymond, Wis. 8th, Gold Hill, Colo.; Dupont, Ohio; Pepin, Wis. 9th, Falls Village, Conn.; Clear Lake, Minn.; Lancaster, N. H.; Turin, N. Y.; Larimore and Wild Rice, N. Dak.; Dupont, Ohio; Chelsea, Hartlandt, and Woodstock, Vt.; Pepin and Shawano, Wis. 10th, Berlin Mills, N. H.; Turin, N. Y.; Fort Buford, N. Dak.; Shawano, Wis. 11th, Wild Rice, N. Dak. 12th, Big Prairie, Ohio. 14th, Berlin Mills and Bethlehem, N. H.; Turin and Waverly, N. Y.; Big Prairie, Ohio; Chelsea, Vt. 15th, Mayville, N. Dak. 16th, Berlin Mills, N. H. 17th, Clinton, Iowa; Wild Rice,

N. Dak. 18th, Vevay, Ind.; Blue Hill Observatory, Concord, Winthrop, and Worcester, Mass.; Albion, Manistee, and Marquette, Mich.; Fergus Falls, Granite Falls, Saint Cloud, and Saint Olaf, Minn.; Grafton, N. H.; Gloversville, Oswego, Perry City, Turin, and Waverly, N. Y.; Forman, Larimore, Mayville, and Wild Rice, N. Dak.; Kimball and Webster, S. Dak.; Hartlandt, Strafford, and Vernon, Vt.; Ashland, Medford, Raymond, Shawano, Stevens Point, and Westfield, Wis. 19th, Vevay, Ind.; Fergus Falls, Minn.; Turin, N. Y.; Ashland, Medford, Oconomowoc, and Shawano, Wis. 21st, Beloit, Kans. 23d, Degonia Springs, Ind.; Clinton, Iowa; Waverly, N. Y. 26th, Fall River, Mass.; Big Prairie, Ohio. 27th, Big Prairie, Ohio. 29th, Cumberland (a), Md.; Chelsea, Vt.; Berlin Mills, N. H.

## STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for June, 1893, of the directors of the various state weather services:

### ALABAMA.

**Temperature.**—The mean was 1.0 below the normal; maximum, 101, at Brewton, 26th and 27th; minimum, 50, at Healing Springs, 1st and 2d; greatest monthly range, 46, at Healing Springs; least monthly range, 25, at Citronelle and Newbern.

**Precipitation.**—The average was 0.04 below the normal; greatest monthly, 9.06, at Newburg; least monthly, 2.69, at Thomasville.

**Wind.**—Prevailing directions, south and southwest.—*P. H. Mell, Observer, Weather Bureau, Auburn, director.*

### ARIZONA.

**Temperature.**—Maximum, 116, at Fort Mohave, 7th; minimum, 39, at Whipple Barracks, 5th and 14th; greatest monthly range, 60, at Buckeye and San Carlos; least monthly range, 80, at Saint Helena Ranch.

**Precipitation.**—Greatest monthly, 0.29, at Chiricahua Mountains; least monthly, 0.00, at 27 stations.

**Wind.**—Prevailing direction, southwest.—*W. Burrows, Observer, Weather Bureau, Tucson, director.*

### ARKANSAS.

**Temperature.**—The mean was 0.6 below the normal; maximum, 99, at Hot Springs, 13th and 26th; minimum, 49, at Keesees Ferry, 8th, at Gainesville, Mo., 17th, and at Melbourne, 18th; greatest monthly range, 49, at Hot Springs; least monthly range, 32, at Mount Nebo, Osceola, Prescott, and Greenville, Miss.

**Precipitation.**—The average was 0.94 above the normal; greatest monthly, 10.24, at Camden; least monthly, 1.14, at Rogers.

**Wind.**—Prevailing direction, south.—*F. H. Clarke, Local Forecast Official, Weather Bureau, Little Rock, director.*

### CALIFORNIA.

**Temperature.**—The mean was 3.8 below the normal; maximum, 110, at Needles, 6th and 7th; minimum, 25, at Fort Bidwell, 17th; greatest monthly range, 70, at San Ardo.

**Precipitation.**—The average was 0.28 below the normal; greatest monthly, 0.91, at Crescent City; least monthly, 0.00, over the greater portion of the state.—*J. A. Barwick, Observer, Weather Bureau, Sacramento, director.*

### COLORADO.

**Temperature.**—The mean was 2.0 above the normal; maximum, 106, at Lamar, 23d; minimum, 9, at Pikes Peak, 4th.

**Precipitation.**—The average was about 0.75 below the normal; greatest monthly, 4.66, at Amherst; least monthly, 0.00, at a number of stations.

**Wind.**—Prevailing directions, south and west.—*J. J. Gilligan, Observer, Weather Bureau, Denver, director.*

### FLORIDA.

**Temperature.**—Maximum, 104, at Micco, 23d; minimum, 60, at Orlando, 9th, 10th, and 11th; greatest monthly range, 34, at Micco and Orlando; least monthly range, 18, at Key West.

**Precipitation.**—Greatest monthly, 14.18, at Brooksville; least monthly, 2.32, at Saint Augustine.

**Wind.**—Prevailing direction, southeast.—*E. R. Demain, Observer, Weather Bureau, Jacksonville, director.*

### GEORGIA.

**Temperature.**—Maximum, 100, at Americus, 12th and 17th, and at Cordele, 8th, 20th, 23d, and 25th; minimum, 52, at Diamond, 11th and 14th; greatest monthly range, 42, at Cordele, Lincolnton, and Thomasville; least monthly range, 22, at West Point.

**Precipitation.**—Greatest monthly, 13.25, at Darien; least monthly, 2.10, at Morgan.

**Wind.**—Prevailing direction, south.—*Park Morrill, Local Forecast Official, Weather Bureau, Atlanta, director.*

### IDAHO.

**Temperature.**—Maximum, 97, at Payette, 30th; minimum, 20, at Lake, 5th, 6th, and 7th; greatest monthly range, 70, at Lake; least monthly range, 42, at Moscow.

**Precipitation.**—Greatest monthly, 0.86, at Delta; least monthly, 0.00, at Martin and American Falls.

**Wind.**—Prevailing direction, southwest.—*J. H. Smith, Observer, Weather Bureau, Idaho Falls, director.*

### ILLINOIS.

**Temperature.**—The mean was 1.5 above the normal; maximum, 98, at Walnut, 18th; minimum, 42, at Fort Sheridan, 11th.

**Precipitation.**—The average was 1.38 below the normal; greatest monthly, 7.59, at Cairo; least monthly, 0.80, at Bloomington.

**Wind.**—Prevailing direction, southwest.—*John Craig, Observer, Weather Bureau, Springfield, director.*

### INDIANA.

**Temperature.**—The mean was normal; maximum, 101, at Ashboro, 19th; minimum, 40, at Valparaiso, 1st and 2d; greatest monthly range, 54, at Union City; least monthly range, 28, at Huntingburg and New Albany.

**Precipitation.**—The average was 0.80 below the normal; greatest monthly, 7.15, at Huntingburg; least monthly, 0.20, at Valparaiso.

**Wind.**—Prevailing direction, southwest.—*Prof. H. A. Huston, Lafayette, director; C. F. R. Wappenhans, Local Forecast Official, Weather Bureau, assistant.*

### IOWA WEATHER AND CROP SERVICE.

**Temperature.**—The mean was about 2.0 above the normal; maximum, 100, at Richland, 12th, and at Washington, 19th; minimum, 40, at Atlantic, 5th, and at Sibley, 6th; greatest monthly range, 55, at Atlantic; least monthly range, 31, at Fort Madison.

**Precipitation.**—The average was 1.00 below the normal; greatest monthly, 7.56, at Atlantic; least monthly, 1.36, at Rock Rapids.

**Wind.**—Prevailing direction, southeast.—*J. R. Sage, Des Moines, director; G. M. Chappel, Local Forecast Official, Weather Bureau, assistant.*

### KANSAS.

**Temperature.**—The mean was 0.5 above the normal; maximum, 114, at Lakin, 20th; minimum, 31, at Manhattan, 5th; greatest monthly range, 79, at Lakin; least monthly range, 36, at Lawrence.

**Precipitation.**—The average was 0.38 above the normal; greatest monthly, 13.10, at Lebo; least monthly, 0.51, at Syracuse.

**Wind.**—Prevailing direction, south.—*T. B. Jennings, Observer, Weather Bureau, Topeka, director.*

### KENTUCKY.

**Temperature.**—Maximum, 97, at Shelbyville, 19th; minimum, 48, at Harrodsburg, 8th, and at Paducah, 1st; greatest monthly range, 48, at Harrodsburg; least monthly range, 20, at South Fork.

**Precipitation.**—Greatest monthly, 9.30, at Munfordsville; least monthly, 1.08, at Caddo.

**Wind.**—Prevailing direction, southwest.—*Frank Burke, Local Forecast Official, Weather Bureau, Louisville, director.*

### LOUISIANA.

**Temperature.**—The mean was 1.2 below the normal; maximum, 100, at